



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-22-039

July 13, 2022

10 CFR 50.90

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Browns Ferry Nuclear Plant, Units 1, 2, and 3  
Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68  
NRC Docket Nos. 50-259, 50-260, 50-296, and 72-052

Sequoyah Nuclear Plant, Units 1 and 2  
Renewed Facility Operating License Nos. DPR-77 and DPR-79  
NRC Docket Nos. 50-327, 50-328, and 72-034

Watts Bar Nuclear Plant, Units 1 and 2  
Facility Operating License Nos. NPF-90 and NPF-96  
NRC Docket Nos. 50-390, 50-391, and 72-1048

**Subject:      Application to Revise Technical Specifications to Adopt TSTF-554-A,  
Revision 1, "Revise Reactor Coolant Leakage Requirements"  
(BFN TS-537) (SQN-21-05) (WBN-TS-21-04)**

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," Tennessee Valley Authority (TVA) is submitting a request for an amendment to Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3; Renewed Facility Operating License Nos. DPR-77 and DPR-79 for the Sequoyah Nuclear Plant (SQN), Units 1 and 2; and Facility Operating License Nos. NPF-90 and NPF-96 for the Watts Bar Nuclear Plant (WBN), Units 1 and 2, respectively.

TVA requests adoption of Technical Specifications Task Force (TSTF)-554-A, Revision 1, "Revise Reactor Coolant Leakage Requirements," which is an approved change to the Standard Technical Specifications (STS) into the above plants Technical Specifications (TS). The proposed amendment revises the TS definition of "Leakage," clarifies the requirements when pressure boundary leakage is detected, and adds a Required Action when pressure boundary leakage is identified. The change is requested as part of the Consolidated Line Item Improvement Process.

The enclosure provides a description and assessment of the proposed changes. Attachment 1 to the enclosure provides the existing BFN Units 1, 2, and 3, SQN Units 1 and 2, and WBN Units 1 and 2 TS pages marked to show the proposed changes. Attachment 2 to the enclosure provides the existing BFN Units 1, 2, and 3, SQN Units 1 and 2, and WBN Units 1 and 2 TS pages retyped to show the proposed changes. Attachment 3 provides the existing BFN Units 1, 2, and 3, SQN Units 1 and 2, and WBN Units 1 and 2 TS Bases pages marked to show the proposed changes. Changes to the existing TS Bases are provided for information only and will be implemented under the Technical Specification Bases Control Program.

TVA has determined that there is no significant hazards consideration associated with the proposed changes and that the changes qualify for a categorical exclusion from environmental review pursuant to 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Alabama State Department of Public Health and the Tennessee State Department of Environment and Conservation.

Approval of the proposed amendment is requested within six months of the date of this letter. Once approved, the amendment shall be implemented within 30 days.

There are no new regulatory commitments contained in this submittal. Please address any questions regarding this submittal to Stuart L. Rymer, Senior Manager, Fleet Licensing, at [slymer@tva.gov](mailto:slymer@tva.gov).

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 13th day of July 2022.

Sincerely,



Digitally signed by Rearden,  
Pamela S  
Date: 2022.07.13 15:42:13 -04'00'

James Barstow  
Vice President, Nuclear Regulatory Affairs & Support Services

Enclosure: Description and Assessment of the Proposed Change

cc (Enclosure):

NRC Regional Administrator - Region II  
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant  
NRC Senior Resident Inspector - Sequoyah Nuclear Plant  
NRC Senior Resident Inspector - Watts Bar Nuclear Plant  
NRC Project Manager - Browns Ferry Nuclear Plant  
NRC Project Manager - Sequoyah Nuclear Plant  
NRC Project Manager - Watts Bar Nuclear Plant  
State Health Officer, Alabama State Department of Public Health  
Director, Division of Radiological Health - Tennessee State Department of  
Environment and Conservation

## ENCLOSURE

### Description and Assessment of the Proposed Change

Subject:       **Application to Revise Technical Specifications to Adopt TSTF-554-A,  
Revision 1, "Revise Reactor Coolant Leakage Requirements"**

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#### Attachments

- 1.1 Proposed Technical Specification Changes (Mark-up) for Browns Ferry Nuclear Plant
- 1.2 Proposed Technical Specification Changes (Mark-up) for Sequoyah Nuclear Plant
- 1.3 Proposed Technical Specification Changes (Mark-up) for Watts Bar Nuclear Plant
- 2.1 Revised Technical Specification Pages (Retyped) for Browns Ferry Nuclear Plant
- 2.2 Revised Technical Specification Pages (Retyped) for Sequoyah Nuclear Plant
- 2.3 Revised Technical Specification Pages (Retyped) for Watts Bar Nuclear Plant
- 3.1 Proposed Technical Specification Bases Changes (Markup) for Browns Ferry Unit 1 (for Information Only)
- 3.2 Proposed Technical Specification Bases Changes (Markup) for Sequoyah Unit 1 (for Information Only)
- 3.3 Proposed Technical Specification Bases Changes (Markup) for Watts Bar Unit 1 (for Information Only)

## **Description and Assessment of the Proposed Change**

### **1.0 DESCRIPTION**

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," Tennessee Valley Authority (TVA) is submitting a request for an amendment to Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3; Renewed Facility Operating License Nos. DPR-77 and DPR-79 for the Sequoyah Nuclear Plant (SQN), Units 1 and 2; and Facility Operating License Nos. NPF-90 and NPF-96 for the Watts Bar Nuclear Plant (WBN), Units 1 and 2, respectively.

TVA requests adoption of Technical Specifications Task Force (TSTF)-554-A, Revision 1, "Revise Reactor Coolant Leakage Requirements," which is an approved change to the Standard Technical Specifications (STS), into BFN Units 1, 2, and 3; SQN Units 1 and 2; and WBN Units 1 and 2 Technical Specifications (TS). The proposed amendment revises the TS definition of "Leakage" and the Reactor Coolant System (RCS) Operational Leakage TS to clarify the requirements.

### **2.0 ASSESSMENT**

#### **2.1 Applicability of Safety Evaluation**

TVA has reviewed the safety evaluation for TSTF-554 provided to the Technical Specifications Task Force in a letter dated December 18, 2020. This review included a review of the Nuclear Regulatory Commission (NRC) staff's evaluation, as well as the information provided in TSTF-554-A. As described herein, TVA has concluded that the justifications presented in TSTF-554-A and the safety evaluation prepared by the NRC staff are applicable to BFN Units 1, 2, and 3, SQN Units 1 and 2, and WBN Units 1 and 2 and justify this amendment for the incorporation of the changes to the respective plant TS.

#### **2.2 Variations**

TVA is not proposing any variations from the TS changes described in TSTF-554-A, Revision 1 or the applicable parts of the NRC staff's safety evaluation dated December 18, 2020.

### **3.0 REGULATORY ANALYSIS**

#### **3.1 No Significant Hazards Consideration Analysis**

TVA requests adoption of TSTF-554-A, Revision 1, "Revise Reactor Coolant Leakage Requirements," that is an approved change to the STS, into the BFN Units 1, 2, and 3; SQN Units 1 and 2; and WBN Units 1 and 2 TS. The proposed amendment revises the TS definition of "Leakage," clarifies the requirements when pressure boundary leakage is detected, and adds a Required Action when pressure boundary leakage is identified.

## Enclosure

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below.

1. *Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?*

### **Response: No**

The proposed amendment revises the TS definition of "Leakage," clarifies the requirements when pressure boundary leakage is detected and adds a Required Action when pressure boundary leakage is identified.

The proposed change revises the definition of pressure boundary leakage. Pressure boundary leakage is a precursor to some accidents previously evaluated. The proposed change expands the definition of pressure boundary leakage by eliminating the qualification that pressure boundary leakage must be from a "non-isolable" flaw. A new TS Action is created which requires isolation of the pressure boundary flaw from the RCS. This new action provides assurance that the flaw will not result in any accident previously evaluated.

Pressure boundary leakage, and the actions taken when pressure boundary leakage is detected, is not assumed in the mitigation of any accident previously evaluated. As a result, the consequences of any accident previously evaluated are unaffected.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. *Does the proposed amendment create the possibility of a new or different kind of accident from any previously evaluated?*

### **Response: No**

The proposed amendment revises the TS definition of "Leakage," clarifies the requirements when pressure boundary leakage is detected and adds a Required Action when pressure boundary leakage is identified. The proposed change does not alter the design function or operation of the RCS. The proposed change does not alter the ability of the RCS to perform its design function. Since pressure boundary leakage is an evaluated accident, the proposed change does not create any new failure mechanisms, malfunctions, or accident initiators not considered in the design and licensing bases.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. *Does the proposed amendment involve a significant reduction in a margin of safety?*

**Response: No**

The proposed amendment revises the TS definition of "Leakage," clarifies the requirements when pressure boundary leakage is detected and adds a Required Action when pressure boundary leakage is identified. The proposed change does not affect the initial assumptions, margins, or controlling values used in any accident analysis. The amount of leakage allowed from the RCS is not increased. The proposed change does not affect any design basis or safety limit or any limiting condition for operation.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

3.2 Conclusion

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with NRC regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

**4.0 ENVIRONMENTAL EVALUATION**

The proposed license amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

Attachment 1.1

Proposed TS Changes (Markups)  
Browns Ferry Nuclear Plant, Units 1, 2, and 3

## 1.1 Definitions (continued)

## LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE into the drywell, such as that from pump seals or valve packing, that is captured and conducted to a sump or collecting tank; or
2. LEAKAGE into the drywell atmosphere from sources that are both specifically located and known ~~to either not to~~ interfere with the operation of leakage detection systems ~~or not to be pressure boundary LEAKAGE~~;

b. Unidentified LEAKAGE

All LEAKAGE into the drywell that is not identified LEAKAGE;

c. Total LEAKAGE

Sum of the identified and unidentified LEAKAGE;

d. Pressure Boundary LEAKAGE

LEAKAGE through a ~~nonisolable~~ fault in a Reactor Coolant System (RCS) component body, pipe wall, or vessel wall. ~~LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.~~

LINEAR HEAT  
GENERATION RATE  
(LHGR)

The LHGR shall be the heat generation rate per unit length of fuel rod. It is the integral of the heat flux over the heat transfer area associated with the unit length.

(continued)



### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.4 RCS Operational LEAKAGE

LCO 3.4.4 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b.  $\leq 5$  gpm unidentified LEAKAGE; and
- c.  $\leq 30$  gpm total LEAKAGE averaged over the previous 24 hour period; and
- d.  $\leq 2$  gpm increase in unidentified LEAKAGE within the previous 24 hour period in MODE 1.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
BA. Unidentified LEAKAGE not within limit.  <u>OR</u>  Total LEAKAGE not within limit.	BA.1 Reduce LEAKAGE to within limits.	4 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
BC. Unidentified LEAKAGE increase not within limit.	BC.1 Reduce LEAKAGE increase to within limits.	4 hours
	<u>OR</u> CB.2 Verify source of unidentified LEAKAGE increase is not service sensitive type 304 or type 316 austenitic stainless steel.	4 hours
DG. Required Action and associated Completion Time of Condition A or B not met.  <u>OR</u>  <del>Pressure boundary LEAKAGE exists.</del>	DG.1 Be in MODE 3.	12 hours
	<u>AND</u> DG.2 Be in MODE 4.	36 hours

## 1.1 Definitions (continued)

## LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE into the drywell, such as that from pump seals or valve packing, that is captured and conducted to a sump or collecting tank; or
2. LEAKAGE into the drywell atmosphere from sources that are both specifically located and known ~~to either not to~~ interfere with the operation of leakage detection systems ~~or not to be pressure boundary LEAKAGE~~;

b. Unidentified LEAKAGE

All LEAKAGE into the drywell that is not identified LEAKAGE;

c. Total LEAKAGE

Sum of the identified and unidentified LEAKAGE;

d. Pressure Boundary LEAKAGE

LEAKAGE through a ~~nonisolable~~ fault in a Reactor Coolant System (RCS) component body, pipe wall, or vessel wall. ~~LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.~~

LINEAR HEAT  
GENERATION RATE  
(LHGR)

The LHGR shall be the heat generation rate per unit length of fuel rod. It is the integral of the heat flux over the heat transfer area associated with the unit length.

(continued)

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.4 RCS Operational LEAKAGE

LCO 3.4.4 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b.  $\leq 5$  gpm unidentified LEAKAGE; and
- c.  $\leq 30$  gpm total LEAKAGE averaged over the previous 24 hour period; and
- d.  $\leq 2$  gpm increase in unidentified LEAKAGE within the previous 24 hour period in MODE 1.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
BA. Unidentified LEAKAGE not within limit.  <u>OR</u>  Total LEAKAGE not within limit.	BA.1 Reduce LEAKAGE to within limits.	4 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<del>BC.</del> Unidentified LEAKAGE increase not within limit.	<del>CB.1</del> Reduce LEAKAGE increase to within limits.	4 hours
	<u>OR</u>  <del>CB.2</del> Verify source of unidentified LEAKAGE increase is not service sensitive type 304 or type 316 austenitic stainless steel.	4 hours
<del>DC.</del> Required Action and associated Completion Time of Condition A or B not met.  <u>OR</u>  <del>Pressure boundary LEAKAGE exists.</del>	<del>DC.1</del> Be in MODE 3.	12 hours
	<u>AND</u>  <del>DC.2</del> Be in MODE 4.	36 hours

## 1.1 Definitions (continued)

## LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE into the drywell, such as that from pump seals or valve packing, that is captured and conducted to a sump or collecting tank; or
2. LEAKAGE into the drywell atmosphere from sources that are both specifically located and known ~~either to not to~~ interfere with the operation of leakage detection systems ~~or not to be pressure boundary LEAKAGE~~;

b. Unidentified LEAKAGE

All LEAKAGE into the drywell that is not identified LEAKAGE;

c. Total LEAKAGE

Sum of the identified and unidentified LEAKAGE;

d. Pressure Boundary LEAKAGE

LEAKAGE through a ~~nonisolable~~ fault in a Reactor Coolant System (RCS) component body, pipe wall, or vessel wall. ~~LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.~~

LINEAR HEAT  
GENERATION RATE  
(LHGR)

The LHGR shall be the heat generation rate per unit length of fuel rod. It is the integral of the heat flux over the heat transfer area associated with the unit length.

(continued)

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.4 RCS Operational LEAKAGE

LCO 3.4.4 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b.  $\leq 5$  gpm unidentified LEAKAGE; and
- c.  $\leq 30$  gpm total LEAKAGE averaged over the previous 24 hour period; and
- d.  $\leq 2$  gpm increase in unidentified LEAKAGE within the previous 24 hour period in MODE 1.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
BA. Unidentified LEAKAGE not within limit.  OR  Total LEAKAGE not within limit.	BA.1 Reduce LEAKAGE to within limits.	4 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<del>CB.</del> Unidentified LEAKAGE increase not within limit.	<del>CB.1</del> Reduce LEAKAGE increase to within limits.	4 hours
	<u>OR</u>  <del>CB.2</del> Verify source of unidentified LEAKAGE increase is not service sensitive type 304 or type 316 austenitic stainless steel.	4 hours
<del>DG.</del> Required Action and associated Completion Time of Condition A or B not met.  <u>OR</u>  <del>Pressure boundary LEAKAGE exists.</del>	<del>DG.1</del> Be in MODE 3.	12 hours
	<u>AND</u>  <del>DG.2</del> Be in MODE 4.	36 hours



Attachment 1.2

Proposed TS Changes (Markups) Sequoyah  
Nuclear Plant, Units 1 and 2

## 1.1 Definitions

### ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC, or the components have been evaluated in accordance with an NRC approved methodology.

### LEAKAGE

LEAKAGE shall be:

#### a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known ~~either to not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE~~; or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary to secondary LEAKAGE);

#### b. Unidentified LEAKAGE

All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE; and

#### c. Pressure Boundary LEAKAGE

LEAKAGE (except primary to secondary LEAKAGE) through a ~~nonisolable~~ fault in an RCS component body, pipe wall, or vessel wall. ~~LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.~~

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b. 1 gpm unidentified LEAKAGE;
- c. 10 gpm identified LEAKAGE; and
- d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
AB. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	AB.1 Reduce LEAKAGE to within limits.	4 hours
BC. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>	BC.1 Be in MODE 3.  <u>AND</u>  BC.2 Be in MODE 5.	6 hours   36 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
<del>Pressure boundary LEAKAGE exists.</del>  <u>OR</u>  Primary to secondary LEAKAGE not within limit.		

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.13.1	<p>-----NOTES-----</p> <ol style="list-style-type: none"> <li>Not required to be performed until 12 hours after establishment of steady state operation.</li> <li>Not applicable to primary to secondary LEAKAGE.</li> </ol> <p>-----</p> <p>Verify RCS operational LEAKAGE is within limits by performance of RCS water inventory balance.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.4.13.2	<p>-----NOTE-----</p> <p>Not required to be performed until 12 hours after establishment of steady state operation.</p> <p>-----</p> <p>Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG.</p>	In accordance with the Surveillance Frequency Control Program

## 1.1 Definitions

### ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC, or the components have been evaluated in accordance with an NRC approved methodology.

### LEAKAGE

LEAKAGE shall be:

#### a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known ~~either to not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE~~; or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary to secondary LEAKAGE);

#### b. Unidentified LEAKAGE

All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE; and

#### c. Pressure Boundary LEAKAGE

LEAKAGE (except primary to secondary LEAKAGE) through a ~~nonisolable~~ fault in an RCS component body, pipe wall, or vessel wall. ~~LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.~~

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b. 1 gpm unidentified LEAKAGE;
- c. 10 gpm identified LEAKAGE; and
- d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
AB. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	AB.1 Reduce LEAKAGE to within limits.	4 hours
BC. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>	BC.1 Be in MODE 3.  <u>AND</u>  BC.2 Be in MODE 5.	6 hours   36 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
<del>Pressure boundary LEAKAGE exists.</del>  <u>OR</u>  Primary to secondary LEAKAGE not within limit.		

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.13.1	<p>-----NOTES-----</p> <ol style="list-style-type: none"> <li>Not required to be performed until 12 hours after establishment of steady state operation.</li> <li>Not applicable to primary to secondary LEAKAGE.</li> </ol> <p>-----</p> <p>Verify RCS operational LEAKAGE is within limits by performance of RCS water inventory balance.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.4.13.2	<p>-----NOTE-----</p> <p>Not required to be performed until 12 hours after establishment of steady state operation.</p> <p>-----</p> <p>Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG.</p>	In accordance with the Surveillance Frequency Control Program

Attachment 1.3

Proposed TS Changes (Markups)  
Watts Bar Nuclear Plant, Units 1 and 2



1.1 Definitions (continued)

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ENGINEERED SAFETY  
FEATURE (ESF) RESPONSE  
TIME

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by the NRC, or the components have been evaluated in accordance with an NRC approved methodology.

$L_a$

The maximum allowable primary containment leakage rate,  $L_a$ , shall be .25% of primary containment air weight per day at the calculated peak containment pressure ( $P_a$ ).

LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known ~~to either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE~~; or

(continued)

## 1.1 Definitions

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LEAKAGE (continued)	<p>3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary-to-secondary LEAKAGE).;</p>
	<p>b. <u>Unidentified LEAKAGE</u></p> <p>All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE;</p>
	<p>c. <u>Pressure Boundary LEAKAGE</u></p> <p>LEAKAGE (except primary-to-secondary LEAKAGE) through a <del>nonisolable</del> fault in an RCS component body, pipe wall, or vessel wall. LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.</p>
MASTER RELAY TEST	<p>A MASTER RELAY TEST shall consist of energizing each master relay and verifying the OPERABILITY of each relay. The MASTER RELAY TEST shall include a continuity check of each associated slave relay.</p>
MODE	<p>A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.</p>
OPERABLE-OPERABILITY	<p>A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).</p>
PDMS	<p>The Power Distribution Monitoring System (PDMS) is a real-time three dimensional core monitoring system. The system utilizes existing core instrumentation data and an on-line neutronics code to provide surveillance of core thermal limits.</p>
PHYSICS TESTS	<p>PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation. These tests are:</p>

(continued)

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b. 1 gpm unidentified LEAKAGE;
- c. 10 gpm identified LEAKAGE; and
- d. 150 gallons per day primary-to-secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
AB. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary-to-secondary LEAKAGE.	AB.1 Reduce LEAKAGE to within limits.	4 hours
BC. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>  <del>Pressure boundary LEAKAGE exists.</del>  <u>OR</u>  Primary-to-secondary LEAKAGE not within limit.	BC.1 Be in MODE 3.  <u>AND</u>  BC.2 Be in MODE 5.	6 hours    36 hours

1.1 Definitions (continued)

LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known ~~to either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE~~; or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary-to-secondary LEAKAGE);.

b. Unidentified LEAKAGE

All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE;

c. Pressure Boundary LEAKAGE

LEAKAGE (except primary-to-secondary LEAKAGE) through a ~~nonisolable~~ fault in an RCS component body, pipe wall, or vessel wall. ~~LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE~~

MASTER RELAY TEST

A MASTER RELAY TEST shall consist of energizing each master relay and verifying the OPERABILITY of each relay. The MASTER RELAY TEST shall include a continuity check of each associated slave relay.

MODE

A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

- LCO 3.4.13      RCS operational LEAKAGE shall be limited to:
- a. No pressure boundary LEAKAGE;
  - b. 1 gpm unidentified LEAKAGE;
  - c. 10 gpm identified LEAKAGE; and
  - d. 150 gallons per day primary-to-secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY:      MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
A.B. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary-to-secondary LEAKAGE.	AB.1 Reduce LEAKAGE to within limits.	4 hours
	BC.1 Be in MODE 3. <u>AND</u>	6 hours

<p><del>B.C.</del> Required Action and associated Completion Time of <del>Condition A</del> not met.</p> <p><u>OR</u></p> <p><del>Pressure boundary LEAKAGE exists.</del></p> <p><u>OR</u></p> <p>Primary-to-secondary LEAKAGE not within limit.</p>	<p><del>BC.2</del> Be in MODE 5.</p>	<p>36 hours</p>	
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Attachment 2.1

Proposed TS Changes (Final Typed)  
Browns Ferry Nuclear Plant, Units 1, 2, and 3

## 1.1 Definitions (continued)

## LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE into the drywell, such as that from pump seals or valve packing, that is captured and conducted to a sump or collecting tank; or
2. LEAKAGE into the drywell atmosphere from sources that are both specifically located and known to not interfere with the operation of leakage detection systems;

b. Unidentified LEAKAGE

All LEAKAGE into the drywell that is not identified LEAKAGE;

c. Total LEAKAGE

Sum of the identified and unidentified LEAKAGE;

d. Pressure Boundary LEAKAGE

LEAKAGE through a fault in a Reactor Coolant System (RCS) component body, pipe wall, or vessel wall. LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.

LINEAR HEAT  
GENERATION RATE  
(LHGR)

The LHGR shall be the heat generation rate per unit length of fuel rod. It is the integral of the heat flux over the heat transfer area associated with the unit length.

(continued)



### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.4 RCS Operational LEAKAGE

LCO 3.4.4 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b.  $\leq 5$  gpm unidentified LEAKAGE; and
- c.  $\leq 30$  gpm total LEAKAGE averaged over the previous 24 hour period; and
- d.  $\leq 2$  gpm increase in unidentified LEAKAGE within the previous 24 hour period in MODE 1.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
B. Unidentified LEAKAGE not within limit.  <u>OR</u>  Total LEAKAGE not within limit.	B.1 Reduce LEAKAGE to within limits.	4 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Unidentified LEAKAGE increase not within limit.	C.1 Reduce LEAKAGE increase to within limits.	4 hours
	<u>OR</u> C.2 Verify source of unidentified LEAKAGE increase is not service sensitive type 304 or type 316 austenitic stainless steel.	4 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3.	12 hours
	<u>AND</u> D.2 Be in MODE 4.	36 hours

## 1.1 Definitions (continued)

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### LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE into the drywell, such as that from pump seals or valve packing, that is captured and conducted to a sump or collecting tank; or
2. LEAKAGE into the drywell atmosphere from sources that are both specifically located and known to not interfere with the operation of leakage detection systems;

b. Unidentified LEAKAGE

All LEAKAGE into the drywell that is not identified LEAKAGE;

c. Total LEAKAGE

Sum of the identified and unidentified LEAKAGE;

d. Pressure Boundary LEAKAGE

LEAKAGE through a fault in a Reactor Coolant System (RCS) component body, pipe wall, or vessel wall. LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.

### LINEAR HEAT GENERATION RATE (LHGR)

The LHGR shall be the heat generation rate per unit length of fuel rod. It is the integral of the heat flux over the heat transfer area associated with the unit length.

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(continued)

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.4 RCS Operational LEAKAGE

LCO 3.4.4 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b.  $\leq 5$  gpm unidentified LEAKAGE; and
- c.  $\leq 30$  gpm total LEAKAGE averaged over the previous 24 hour period; and
- d.  $\leq 2$  gpm increase in unidentified LEAKAGE within the previous 24 hour period in MODE 1.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
B. Unidentified LEAKAGE not within limit.  <u>OR</u>  Total LEAKAGE not within limit.	B.1 Reduce LEAKAGE to within limits.	4 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Unidentified LEAKAGE increase not within limit.	C.1 Reduce LEAKAGE increase to within limits.	4 hours
	<u>OR</u> C.2 Verify source of unidentified LEAKAGE increase is not service sensitive type 304 or type 316 austenitic stainless steel.	4 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3.	12 hours
	<u>AND</u> D.2 Be in MODE 4.	36 hours

## 1.1 Definitions (continued)

## LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE into the drywell, such as that from pump seals or valve packing, that is captured and conducted to a sump or collecting tank; or
2. LEAKAGE into the drywell atmosphere from sources that are both specifically located and known to not interfere with the operation of leakage detection systems;

b. Unidentified LEAKAGE

All LEAKAGE into the drywell that is not identified LEAKAGE;

c. Total LEAKAGE

Sum of the identified and unidentified LEAKAGE;

d. Pressure Boundary LEAKAGE

LEAKAGE through a fault in a Reactor Coolant System (RCS) component body, pipe wall, or vessel wall. LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.

LINEAR HEAT  
GENERATION RATE  
(LHGR)

The LHGR shall be the heat generation rate per unit length of fuel rod. It is the integral of the heat flux over the heat transfer area associated with the unit length.

(continued)

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.4 RCS Operational LEAKAGE

LCO 3.4.4 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b.  $\leq 5$  gpm unidentified LEAKAGE; and
- c.  $\leq 30$  gpm total LEAKAGE averaged over the previous 24 hour period; and
- d.  $\leq 2$  gpm increase in unidentified LEAKAGE within the previous 24 hour period in MODE 1.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
B. Unidentified LEAKAGE not within limit.  OR  Total LEAKAGE not within limit.	B.1 Reduce LEAKAGE to within limits.	4 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Unidentified LEAKAGE increase not within limit.	C.1 Reduce LEAKAGE increase to within limits.	4 hours
	<u>OR</u> C.2 Verify source of unidentified LEAKAGE increase is not service sensitive type 304 or type 316 austenitic stainless steel.	4 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3.	12 hours
	<u>AND</u> D.2 Be in MODE 4.	36 hours



Attachment 2.2

Proposed TS Changes (Final Typed)  
Sequoyah Nuclear Plant, Units 1 and 2

## 1.1 Definitions

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### ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC, or the components have been evaluated in accordance with an NRC approved methodology.

### LEAKAGE

LEAKAGE shall be:

#### a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known to not interfere with the operation of leakage detection systems; or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary to secondary LEAKAGE);

#### b. Unidentified LEAKAGE

All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE; and

#### c. Pressure Boundary LEAKAGE

LEAKAGE (except primary to secondary LEAKAGE) through a fault in an RCS component body, pipe wall, or vessel wall. LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b. 1 gpm unidentified LEAKAGE;
- c. 10 gpm identified LEAKAGE; and
- d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
B. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	B.1 Reduce LEAKAGE to within limits.	4 hours
C. Required Action and associated Completion Time not met.  <u>OR</u>  Primary to secondary LEAKAGE not within limit.	C.1 Be in MODE 3.  <u>AND</u>  C.2 Be in MODE 5.	6 hours   36 hours

## 1.1 Definitions

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### ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC, or the components have been evaluated in accordance with an NRC approved methodology.

### LEAKAGE

LEAKAGE shall be:

#### a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known to not interfere with the operation of leakage detection systems; or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary to secondary LEAKAGE);

#### b. Unidentified LEAKAGE

All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE; and

#### c. Pressure Boundary LEAKAGE

LEAKAGE (except primary to secondary LEAKAGE) through a fault in an RCS component body, pipe wall, or vessel wall. LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b. 1 gpm unidentified LEAKAGE;
- c. 10 gpm identified LEAKAGE; and
- d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
B. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	B.1 Reduce LEAKAGE to within limits.	4 hours
C. Required Action and associated Completion Time not met.  <u>OR</u>  Primary to secondary LEAKAGE not within limit.	C.1 Be in MODE 3.  <u>AND</u>  C.2 Be in MODE 5.	6 hours   36 hours

## Attachment 2.3

Proposed TS Changes (Final Typed)  
Watts Bar Nuclear Plant, Units 1 and 2

1.1 Definitions (continued)

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ENGINEERED SAFETY  
FEATURE (ESF) RESPONSE  
TIME

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by the NRC, or the components have been evaluated in accordance with an NRC approved methodology.

$L_a$

The maximum allowable primary containment leakage rate,  $L_a$ , shall be .25% of primary containment air weight per day at the calculated peak containment pressure ( $P_a$ ).

LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known to not interfere with the operation of leakage detection systems; or

(continued)

## 1.1 Definitions

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LEAKAGE (continued)	<p>3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary-to-secondary LEAKAGE);</p> <p>b. <u>Unidentified LEAKAGE</u>  All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE;</p> <p>c. <u>Pressure Boundary LEAKAGE</u>  LEAKAGE (except primary-to-secondary LEAKAGE) through a fault in an RCS component body, pipe wall, or vessel wall. LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.</p>
MASTER RELAY TEST	A MASTER RELAY TEST shall consist of energizing each master relay and verifying the OPERABILITY of each relay. The MASTER RELAY TEST shall include a continuity check of each associated slave relay.
MODE	A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.
OPERABLE-OPERABILITY	A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
PDMS	The Power Distribution Monitoring System (PDMS) is a real-time three dimensional core monitoring system. The system utilizes existing core instrumentation data and an on-line neutronics code to provide surveillance of core thermal limits.
PHYSICS TESTS	PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation. These tests are:

(continued)



### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b. 1 gpm unidentified LEAKAGE;
- c. 10 gpm identified LEAKAGE; and
- d. 150 gallons per day primary-to-secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
B. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary-to-secondary LEAKAGE.	B.1 Reduce LEAKAGE to within limits.	4 hours
C. Required Action and associated Completion Time not met.  <u>OR</u>  Primary-to-secondary LEAKAGE not within limit.	C.1 Be in MODE 3.  <u>AND</u>  C.2 Be in MODE 5.	6 hours   36 hours

## 1.1 Definitions (continued)

### LEAKAGE

LEAKAGE shall be:

#### a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known to not interfere with the operation of leakage detection systems; or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary-to-secondary LEAKAGE);

#### b. Unidentified LEAKAGE

All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE;

#### c. Pressure Boundary LEAKAGE

LEAKAGE (except primary-to-secondary LEAKAGE) through a fault in an RCS component body, pipe wall, or vessel wall. LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE.

### MASTER RELAY TEST

A MASTER RELAY TEST shall consist of energizing each master relay and verifying the OPERABILITY of each relay. The MASTER RELAY TEST shall include a continuity check of each associated slave relay.

### MODE

A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.

(continued)

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

- LCO 3.4.13                      RCS operational LEAKAGE shall be limited to:
- a.        No pressure boundary LEAKAGE;
  - b.        1 gpm unidentified LEAKAGE;
  - c.        10 gpm identified LEAKAGE; and
  - d.        150 gallons per day primary-to-secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY:        MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A.    Pressure boundary LEAKAGE exists.	A.1    Isolate affected component, pipe or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
B.    RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary-to-secondary LEAKAGE.	B.1    Reduce LEAKAGE to within limits.	4 hours
C.    Required Action and associated Completion Time not met.  <u>OR</u>  Primary-to-secondary LEAKAGE not within limit.	C.1    Be in MODE 3.  <u>AND</u>  C.2    Be in MODE 5.	6 hours    36 hours

Attachment 3.1

Proposed TS Bases Changes (Markups) (For Information Only)  
Browns Ferry Nuclear Plant, Units 1, 2, and 3

## BASES

### APPLICABLE SAFETY ANALYSES (continued)

The low limit on increase in unidentified LEAKAGE assumes a failure mechanism of intergranular stress corrosion cracking (IGSCC) that produces tight cracks. This flow increase limit is capable of providing an early warning of such deterioration.

No applicable safety analysis assumes the total LEAKAGE limit. The total LEAKAGE limit considers RCS inventory makeup capability and drywell floor sump capacity.

RCS operational LEAKAGE satisfies Criterion 2 of the NRC Policy Statement (Ref. 8).

### LCO

RCS operational LEAKAGE shall be limited to:

#### a. Pressure Boundary LEAKAGE

~~No Pressure boundary LEAKAGE is prohibited, since it is indicative of material degradation. LEAKAGE of this type is unacceptable~~ as the leak itself could cause further RCPB deterioration, resulting in higher LEAKAGE. ~~Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals, valve seats, and gaskets is not pressure boundary LEAKAGE.~~

#### b. Unidentified LEAKAGE

The 5 gpm of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and drywell sump level monitoring equipment can detect within a reasonable time period. ~~Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of potentially adverse conditions, assessment of the safety significance, and corrective action. Violation of this LCO could result in continued degradation of the RCPB.~~

(continued)

## BASES

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### LCO (continued)

#### c. Total LEAKAGE

The total LEAKAGE limit is based on a reasonable minimum detectable amount. The limit also accounts for LEAKAGE from known sources (identified LEAKAGE). Violation of this LCO indicates an unexpected amount of LEAKAGE and, therefore, could indicate new or additional degradation in an RCPB component or system.

#### d. Unidentified LEAKAGE Increase

An unidentified LEAKAGE increase of > 2 gpm within the previous 24 hour period indicates a potential flaw in the RCPB and must be quickly evaluated to determine the source and extent of the LEAKAGE. The increase is measured relative to the steady state value; temporary changes in LEAKAGE rate as a result of transient conditions (e.g., startup) are not considered. As such, the 2 gpm increase limit is only applicable in MODE 1 when operating pressures and temperatures are established. ~~Violation of this LCO could result in continued degradation of the RCPB.~~

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### APPLICABILITY

In MODES 1, 2, and 3, the RCS operational LEAKAGE LCO applies, because the potential for RCPB LEAKAGE is greatest when the reactor is pressurized.

In MODES 4 and 5, RCS operational LEAKAGE limits are not required since the reactor is not pressurized and stresses in the RCPB materials and potential for LEAKAGE are reduced.

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(continued)

BASES (continued)

ACTIONS

A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

B.1

With RCS unidentified or total LEAKAGE greater than the limits, actions must be taken to reduce the leak. Because the LEAKAGE limits are conservatively below the LEAKAGE that would constitute a critical crack size, 4 hours is allowed to reduce the LEAKAGE rates before the reactor must be shut down. If an unidentified LEAKAGE has been identified and quantified, it may be reclassified and considered as identified LEAKAGE; however, the total LEAKAGE limit would remain unchanged.

CB.1 and CB.2

An unidentified LEAKAGE increase of > 2 gpm within a 24 hour period is an indication of a potential flaw in the RCPB and must be quickly evaluated. Although the increase does not necessarily violate the absolute unidentified LEAKAGE limit, certain susceptible components must be determined not to be the source of the LEAKAGE increase within the required Completion Time. For an unidentified LEAKAGE increase greater than required limits, an alternative to reducing LEAKAGE increase to within limits (i.e., reducing the leakage rate such that the current rate is less than the "2 gpm increase in the previous 24 hours" limit; either by isolating the source or other possible methods) is to evaluate service sensitive type 304 and type 316 austenitic stainless steel piping that is subject to high stress or that contains relatively stagnant or intermittent flow fluids and determine it is not the source of the increased LEAKAGE. This type piping is very susceptible to IGSCC.

The 4 hour Completion Time is reasonable to properly reduce the LEAKAGE increase or verify the source before the reactor must be shut down without unduly jeopardizing plant safety.

(continued)

## BASES

### ACTIONS (continued)

#### DC.1 and DC.2

If any Required Action and associated Completion Time ~~of Condition A or B~~ is not met ~~or if pressure boundary LEAKAGE exists~~, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant safety systems.

### SURVEILLANCE REQUIREMENTS

#### SR 3.4.4.1

The RCS LEAKAGE is monitored by a variety of instruments designed to provide alarms when LEAKAGE is indicated and to quantify the various types of LEAKAGE. Leakage detection instrumentation is discussed in more detail in the Bases for LCO 3.4.5, "RCS Leakage Detection Instrumentation." Sump level and flow rate are typically monitored to determine actual LEAKAGE rates; however, other methods may be used to quantify LEAKAGE. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

(continued)



## BASES

### APPLICABLE SAFETY ANALYSES (continued)

The low limit on increase in unidentified LEAKAGE assumes a failure mechanism of intergranular stress corrosion cracking (IGSCC) that produces tight cracks. This flow increase limit is capable of providing an early warning of such deterioration.

No applicable safety analysis assumes the total LEAKAGE limit. The total LEAKAGE limit considers RCS inventory makeup capability and drywell floor sump capacity.

RCS operational LEAKAGE satisfies Criterion 2 of the NRC Policy Statement (Ref. 8).

### LCO

RCS operational LEAKAGE shall be limited to:

#### a. Pressure Boundary LEAKAGE

~~No P~~ pressure boundary LEAKAGE is ~~prohibited~~ allowed, ~~since it is indicative of material degradation. LEAKAGE of this type is unacceptable~~ as the leak itself could cause further RCPB deterioration, resulting in higher LEAKAGE. ~~Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals, valve seats, and gaskets is not pressure boundary LEAKAGE.~~

#### b. Unidentified LEAKAGE

The 5 gpm of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and drywell sump level monitoring equipment can detect within a reasonable time period. ~~Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of potentially adverse conditions, assessment of the safety significance, and corrective action. Violation of this LCO could result in continued degradation of the RCPB.~~

(continued)

## BASES

### LCO (continued)

#### c. Total LEAKAGE

The total LEAKAGE limit is based on a reasonable minimum detectable amount. The limit also accounts for LEAKAGE from known sources (identified LEAKAGE). Violation of this LCO indicates an unexpected amount of LEAKAGE and, therefore, could indicate new or additional degradation in an RCPB component or system.

#### d. Unidentified LEAKAGE Increase

An unidentified LEAKAGE increase of > 2 gpm within the previous 24 hour period indicates a potential flaw in the RCPB and must be quickly evaluated to determine the source and extent of the LEAKAGE. The increase is measured relative to the steady state value; temporary changes in LEAKAGE rate as a result of transient conditions (e.g., startup) are not considered. As such, the 2 gpm increase limit is only applicable in MODE 1 when operating pressures and temperatures are established. ~~Violation of this LCO could result in continued degradation of the RCPB.~~

### APPLICABILITY

In MODES 1, 2, and 3, the RCS operational LEAKAGE LCO applies, because the potential for RCPB LEAKAGE is greatest when the reactor is pressurized.

In MODES 4 and 5, RCS operational LEAKAGE limits are not required since the reactor is not pressurized and stresses in the RCPB materials and potential for LEAKAGE are reduced.

(continued)

BASES (continued)

ACTIONS

A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

B.1

With RCS unidentified or total LEAKAGE greater than the limits, actions must be taken to reduce the leak. Because the LEAKAGE limits are conservatively below the LEAKAGE that would constitute a critical crack size, 4 hours is allowed to reduce the LEAKAGE rates before the reactor must be shut down. If an unidentified LEAKAGE has been identified and quantified, it may be reclassified and considered as identified LEAKAGE; however, the total LEAKAGE limit would remain unchanged.

CB.1 and CB.2

An unidentified LEAKAGE increase of > 2 gpm within a 24 hour period is an indication of a potential flaw in the RCPB and must be quickly evaluated. Although the increase does not necessarily violate the absolute unidentified LEAKAGE limit, certain susceptible components must be determined not to be the source of the LEAKAGE increase within the required Completion Time. For an unidentified LEAKAGE increase greater than required limits, an alternative to reducing LEAKAGE increase to within limits (i.e., reducing the leakage rate such that the current rate is less than the "2 gpm increase in the previous 24 hours" limit; either by isolating the source or other possible methods) is to evaluate service sensitive type 304 and type 316 austenitic stainless steel piping that is subject to high stress or that contains relatively stagnant or intermittent flow fluids and determine it is not the source of the increased LEAKAGE. This type piping is very susceptible to IGSCC.

The 4 hour Completion Time is reasonable to properly reduce the LEAKAGE increase or verify the source before the reactor must be shut down without unduly jeopardizing plant safety.

(continued)

## BASES

### ACTIONS (continued)

#### DC.1 and DC.2

If any Required Action and associated Completion Time ~~of Condition A or B~~ is not met ~~or if pressure boundary LEAKAGE exists~~, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant safety systems.

### SURVEILLANCE REQUIREMENTS

#### SR 3.4.4.1

The RCS LEAKAGE is monitored by a variety of instruments designed to provide alarms when LEAKAGE is indicated and to quantify the various types of LEAKAGE. Leakage detection instrumentation is discussed in more detail in the Bases for LCO 3.4.5, "RCS Leakage Detection Instrumentation." Sump level and flow rate are typically monitored to determine actual LEAKAGE rates; however, other methods may be used to quantify LEAKAGE. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

(continued)

## BASES

### APPLICABLE SAFETY ANALYSES (continued)

The low limit on increase in unidentified LEAKAGE assumes a failure mechanism of intergranular stress corrosion cracking (IGSCC) that produces tight cracks. This flow increase limit is capable of providing an early warning of such deterioration.

No applicable safety analysis assumes the total LEAKAGE limit. The total LEAKAGE limit considers RCS inventory makeup capability and drywell floor sump capacity.

RCS operational LEAKAGE satisfies Criterion 2 of the NRC Policy Statement (Ref. 8).

### LCO

RCS operational LEAKAGE shall be limited to:

#### a. Pressure Boundary LEAKAGE

~~No P~~pressure boundary LEAKAGE is ~~prohibited~~allowed, ~~since it is indicative of material degradation. LEAKAGE of this type is unacceptable~~ as the leak itself could cause further RCPB deterioration, resulting in higher LEAKAGE. ~~Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals, valve seats, and gaskets is not pressure boundary LEAKAGE.~~

#### b. Unidentified LEAKAGE

The 5 gpm of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and drywell sump level monitoring equipment can detect within a reasonable time period. ~~Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of potentially adverse conditions, assessment of the safety significance, and corrective action. Violation of this LCO could result in continued degradation of the RCPB.~~

(continued)

## BASES

### LCO (continued)

#### c. Total LEAKAGE

The total LEAKAGE limit is based on a reasonable minimum detectable amount. The limit also accounts for LEAKAGE from known sources (identified LEAKAGE). Violation of this LCO indicates an unexpected amount of LEAKAGE and, therefore, could indicate new or additional degradation in an RCPB component or system.

#### d. Unidentified LEAKAGE Increase

An unidentified LEAKAGE increase of > 2 gpm within the previous 24 hour period indicates a potential flaw in the RCPB and must be quickly evaluated to determine the source and extent of the LEAKAGE. The increase is measured relative to the steady state value; temporary changes in LEAKAGE rate as a result of transient conditions (e.g., startup) are not considered. As such, the 2 gpm increase limit is only applicable in MODE 1 when operating pressures and temperatures are established. ~~Violation of this LCO could result in continued degradation of the RCPB.~~

### APPLICABILITY

In MODES 1, 2, and 3, the RCS operational LEAKAGE LCO applies, because the potential for RCPB LEAKAGE is greatest when the reactor is pressurized.

In MODES 4 and 5, RCS operational LEAKAGE limits are not required since the reactor is not pressurized and stresses in the RCPB materials and potential for LEAKAGE are reduced.

(continued)

BASES (continued)

ACTIONS

A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

B.1

With RCS unidentified or total LEAKAGE greater than the limits, actions must be taken to reduce the leak. Because the LEAKAGE limits are conservatively below the LEAKAGE that would constitute a critical crack size, 4 hours is allowed to reduce the LEAKAGE rates before the reactor must be shut down. If an unidentified LEAKAGE has been identified and quantified, it may be reclassified and considered as identified LEAKAGE; however, the total LEAKAGE limit would remain unchanged.

CB.1 and CB.2

An unidentified LEAKAGE increase of > 2 gpm within a 24 hour period is an indication of a potential flaw in the RCPB and must be quickly evaluated. Although the increase does not necessarily violate the absolute unidentified LEAKAGE limit, certain susceptible components must be determined not to be the source of the LEAKAGE increase within the required Completion Time. For an unidentified LEAKAGE increase greater than required limits, an alternative to reducing LEAKAGE increase to within limits (i.e., reducing the leakage rate such that the current rate is less than the "2 gpm increase in the previous 24 hours" limit; either by isolating the source or other possible methods) is to evaluate service sensitive type 304 and type 316 austenitic stainless steel piping that is subject to high stress or that contains relatively stagnant or intermittent flow fluids and determine it is not the source of the increased LEAKAGE. This type piping is very susceptible to IGSCC.

The 4 hour Completion Time is reasonable to properly reduce the LEAKAGE increase or verify the source before the reactor must be shut down without unduly jeopardizing plant safety.

(continued)

## BASES

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### ACTIONS (continued)

#### DC.1 and DC.2

If any Required Action and associated Completion Time ~~of Condition A or B~~ is not met ~~or if pressure boundary LEAKAGE exists~~, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant safety systems.

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### SURVEILLANCE REQUIREMENTS

#### SR 3.4.4.1

The RCS LEAKAGE is monitored by a variety of instruments designed to provide alarms when LEAKAGE is indicated and to quantify the various types of LEAKAGE. Leakage detection instrumentation is discussed in more detail in the Bases for LCO 3.4.5, "RCS Leakage Detection Instrumentation." Sump level and flow rate are typically monitored to determine actual LEAKAGE rates; however, other methods may be used to quantify LEAKAGE. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

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(continued)



## Attachment 3.2

Proposed TS Bases Changes (Markups) (For Information Only)  
Sequoyah Nuclear Plant, Units 1 and 2

## BASES

### APPLICABLE SAFETY ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes 150 gallons per day (gpd) per steam generator (i.e., a total of 0.4 gpm).

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a steam line break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leakage contaminates the secondary fluid.

The UFSAR (Ref. 3) analysis for SGTR assumes the contaminated secondary fluid is only briefly released via the atmospheric relief valve for the affected steam generator. The 0.4 gpm operational primary to secondary leakage from all four steam generators is relatively inconsequential.

The safety analysis for the SLB accident assumes the 150 gpd primary to secondary LEAKAGE is through the affected generator as an initial condition. The dose consequences resulting from the SLB accident are well within the limits defined in 10 CFR 100 or the staff approved licensing basis (i.e., a small fraction of these limits).

The RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

### LCO

RCS operational LEAKAGE shall be limited to:

#### a. Pressure Boundary LEAKAGE

~~No pressure boundary LEAKAGE is prohibited, being indicative of material deterioration. LEAKAGE of this type is unacceptable as the leak itself could cause further RCPB deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~

#### b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. ~~Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of~~

## BASES

### LCO (continued)

potentially adverse conditions, assessment of the safety significance, and corrective action. ~~Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.~~

#### c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include ~~pressure boundary LEAKAGE or~~ controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE). ~~Violation of this LCO could result in continued degradation of a component or system.~~

#### d. Primary to Secondary LEAKAGE Through Any One SG

The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 4). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

### APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

## BASES

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### ACTIONS

#### A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

#### AB.1

Unidentified LEAKAGE or identified LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

#### BC.1 and BC.2

If ~~any pressure boundary LEAKAGE exists, or~~ primary to secondary LEAKAGE is not within limit, or if ~~unidentified or identified LEAKAGE cannot be reduced to within limits within 4 hours~~ any of the Required Actions and associated Completion Times cannot be met, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ The reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors that tend to degrade the pressure boundary.

The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

## BASES

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### SURVEILLANCE REQUIREMENTS

#### SR 3.4.13.1

Verifying RCS LEAKAGE to be within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be met with the reactor at steady state operating conditions (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows). The Surveillance is modified by two Notes. Note 1 states that this SR is not required to be performed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

#### SR 3.4.13.2

This SR verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4.17, "Steam Generator Tube

## BASES

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### SURVEILLANCE REQUIREMENTS (continued)

Integrity," should be evaluated. The 150 gallons per day limit is measured at ambient temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

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### REFERENCES

1. 10 CFR 50, Appendix A, GDC 30.
  2. Regulatory Guide 1.45, May 1973.
  3. UFSAR, Section 15.4.3.
  4. NEI 97-06, "Steam Generator Program Guidelines."
  5. EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."
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## BASES

### APPLICABLE SAFETY ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes 150 gallons per day (gpd) per steam generator (i.e., a total of 0.4 gpm).

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a steam line break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leakage contaminates the secondary fluid.

The UFSAR (Ref. 3) analysis for SGTR assumes the contaminated secondary fluid is only briefly released via the atmospheric relief valve for the affected steam generator. The 0.4 gpm operational primary to secondary leakage from all four steam generators is relatively inconsequential.

The safety analysis for the SLB accident assumes the 150 gpd primary to secondary LEAKAGE is through the affected generator as an initial condition. The dose consequences resulting from the SLB accident are well within the limits defined in 10 CFR 100 or the staff approved licensing basis (i.e., a small fraction of these limits).

The RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

### LCO

RCS operational LEAKAGE shall be limited to:

#### a. Pressure Boundary LEAKAGE

~~No pressure boundary LEAKAGE is prohibited, being indicative of material deterioration. LEAKAGE of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~

#### b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. ~~Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of~~

## BASES

### LCO (continued)

potentially adverse conditions, assessment of the safety significance, and corrective action. ~~Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.~~

#### c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include ~~pressure boundary LEAKAGE or~~ controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE). ~~Violation of this LCO could result in continued degradation of a component or system.~~

#### d. Primary to Secondary LEAKAGE Through Any One SG

The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 4). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

### APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.



## BASES

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### ACTIONS

#### A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

#### AB.1

Unidentified LEAKAGE or identified LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

#### BC.1 and BC.2

If ~~any pressure boundary LEAKAGE exists, or~~ primary to secondary LEAKAGE is not within limit, or if ~~any of the Required Actions and associated Completion Times cannot be met~~ ~~unidentified or identified LEAKAGE cannot be reduced to within limits within 4 hours~~, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ The reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors that tend to degrade the pressure boundary.

The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

## BASES

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### SURVEILLANCE REQUIREMENTS

#### SR 3.4.13.1

Verifying RCS LEAKAGE to be within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be met with the reactor at steady state operating conditions (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows). The Surveillance is modified by two Notes. Note 1 states that this SR is not required to be performed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

#### SR 3.4.13.2

This SR verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4.17, "Steam Generator Tube

## BASES

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### SURVEILLANCE REQUIREMENTS (continued)

Integrity," should be evaluated. The 150 gallons per day limit is measured at ambient temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

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### REFERENCES

1. 10 CFR 50, Appendix A, GDC 30.
  2. Regulatory Guide 1.45, May 1973.
  3. UFSAR, Section 15.4.3.
  4. NEI 97-06, "Steam Generator Program Guidelines."
  5. EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."
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### Attachment 3.3

Proposed TS Bases Changes (Markups) (For Information Only)  
Watts Bar Nuclear Plant, Units 1 and 2

BASES (continued)

APPLICABLE  
SAFETY ANALYSES

Except for primary-to-secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for a main steam line break (MSLB) assumes that the pre-accident primary-to-secondary LEAKAGE from three steam generators is 150 gallons per day (gpd) per steam generator and 1 gallon per minute (gpm) from one steam generator. This leakage assumption remains the same after the accident. For a SGTR accident, the accident analysis assumes a primary-to-secondary leakage of 150 gpd per steam generator prior to the accident. Subsequent to the SGTR a leakage of 150 gpd is assumed in each of three intact steam generators and RCS blowdown flow through the ruptured tube in the faulted steam generator. Consequently, the LCO requirement to limit primary-to-secondary LEAKAGE through any one steam generator to less than or equal to 150 gpd is acceptable.

The safety analysis for the SLB accident assumes the entire 1 gpm primary-to-secondary LEAKAGE is through the affected steam generator as an initial condition. The dose consequences resulting from the SLB accident are within the limits defined in 10 CFR 100 or the staff approved licensing basis (i.e., a small fraction of these limits).

The RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

~~No pressure boundary LEAKAGE is prohibited, being indicative of an off-normal condition. LEAKAGE of this type is unacceptable~~ as the leak itself could cause further deterioration, resulting in higher LEAKAGE. ~~Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~

b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment pocket sump level monitoring equipment can detect within a reasonable time period. ~~Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of potentially adverse conditions, assessment of the safety significance, and corrective action. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.~~ (continued)

BASES

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LCO  
(continued)

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include ~~pressure boundary LEAKAGE or~~ controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE).  
~~Violation of this LCO could result in continued degradation of a component or system.~~

d. Primary to Secondary LEAKAGE through Any One SG

The limit of 150 gpd per SG (600 gpd total for all SGs) is based on the operational LEAKAGE performance criteria in NEI 97-06, Steam Generator Program Guidelines (Ref. 4). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

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APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

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(continued)

BASES

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ACTIONS     A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is **necessary** to prevent further deterioration of the RCPB.

B.1

Unidentified LEAKAGE or identified LEAKAGE, in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

(continued)

BASES (continued)

ACTIONS  
(continued)

BC.1 and BC.2

If ~~any pressure boundary LEAKAGE exists, or~~ primary-to-secondary LEAKAGE is not within limits or if ~~any of the Required Actions and associated Completion Times cannot be met, unidentified or identified LEAKAGE cannot be reduced to within limits within 4 hours,~~ the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ The reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors that tend to degrade the pressure boundary.

The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

SURVEILLANCE  
REQUIREMENTS

SR 3.4.13.1

Verifying RCS LEAKAGE to be within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be met with the reactor at steady state operating conditions and near operating pressure. The SR is modified by 2 Notes. Note 1 states that this SR is not required to be performed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

Steady state operation is required to perform a proper inventory balance; calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment pocket sump level. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

(continued)



BASES (continued)

APPLICABLE  
SAFETY  
ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for a main steam line break (MSLB) assumes that the accident primary-to-secondary LEAKAGE from three steam generators is 150 gallons per day (gpd) per steam generator and 1 gallon per minute (gpm) from one steam generator. For an SGTR accident, the accident analysis assumes a primary-to-secondary leakage of 150 gpd per steam generator prior to the accident. Subsequent to the SGTR a leakage of 150 gpd is assumed in each of three intact steam generators and RCS blowdown flow through the ruptured tube in the faulted steam generator. Consequently, the LCO requirement to limit primary-to-secondary LEAKAGE through any one steam generator to less than or equal to 150 gpd is acceptable.

The safety analysis for the SLB accident assumes the entire 1 gpm primary-to-secondary LEAKAGE is through the affected steam generator as an initial condition. The dose consequences resulting from the SLB accident are within the limits defined in 10 CFR 100 or the staff approved licensing basis (i.e., a small fraction of these limits).

The RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

~~No-p~~Pressure boundary LEAKAGE is ~~prohibited~~ allowed, being indicative of an off-normal condition. LEAKAGE of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.

b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment pocket sump level monitoring equipment can detect within a reasonable time period. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary. Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of potentially adverse conditions, assessment of the safety significance, and corrective action. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.

(continued)

BASES (continued)

LCO  
(continued)

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include ~~pressure boundary LEAKAGE or~~ controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE). ~~Violation of this LCO could result in continued degradation of a component or system.~~

d. Primary to Secondary LEAKAGE through ANY One SG

The limit of 150 gallons per day (gpd) per SG (600 gpd total for all SGs) is based on the operational LEAKAGE performance criteria in NEI 97-06, Steam Generator Program Guidelines (Reference 4). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

ACTIONS

A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

(continued)

Amendment

BASES (continued)

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ACTIONS  
(continued)

B.1

Unidentified LEAKAGE or identified LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

BC.1 and BC.2

If ~~any pressure boundary LEAKAGE exists, or~~ primary-to-secondary LEAKAGE is not within limits, or if ~~unidentified LEAKAGE or identified LEAKAGE cannot be reduced to within limits within 4 hours~~ any of the Required Actions and associated Completion Times cannot be met, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ The reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors that tend to degrade the pressure boundary.

The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

(continued)

Amendment

BASES (continued)

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SURVEILLANCE  
REQUIREMENTS

SR 3.4.13.1

Verifying RCS LEAKAGE to be within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be met with the reactor at steady state operating conditions and near operating pressure. The SR is modified by 2 Notes. Note 1 states that this SR is not required to be performed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

Steady state operation is required to perform a proper inventory balance; calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment pocket sump level. ~~It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.~~ These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

Note 2 states that this SR is not applicable to primary-to-secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

(continued)